

IN THE CLAIMS

1-13 (canceled).

14. (new) A method for producing a micromachined layered device comprising a membrane layer having a first side and a second side, a first layer on said first side of said membrane layer and a second layer on said second side of said membrane layer, said method comprising applying said membrane layer to a substrate, opening a window in said substrate whereby both sides of said membrane layer can be exposed for the addition of further layers thereonto while a portion of said substrate comprising a substrate frame supports said membrane layer during processing thereof, adding at least one layer to each of said first and second sides of said membrane layer, and removing said device from said substrate frame.

15. (new) The method of claim 14 wherein said opening of said window in said substrate comprises a process selected from the group consisting of laser ablation, wet chemical etching, solvating, and dry etching.

16. (new) The method of claim 15 wherein said dry etching comprises a method selected from the group consisting of reactive ion etching and sputter etching.

17. (new) The method of claim 14 wherein said removing of said device from said substrate frame comprises a process selected from the group consisting of wet chemical etching, reactive ion etching, dicing/sawing, cutting, laser ablation, and punching.

18. (new) The method of claim 17 wherein said cutting is carried out by means of a device selected from the group consisting of a scissors and a knife.

19. (new) The method of claim 14 including a patterning step for altering the lateral dimensions of one of said layers of said device.

20. (new) The method of claim 19 wherein said patterning step comprises a process selected from the group consisting of photolithography and soft lithography.

21. (new) The method of claim 14 wherein said substrate comprises a material selected from the group consisting of a polymer, a semiconductor, a metal, an alloy, and glass.

22. (new) The method of claim 21 wherein said semiconductor comprises silicon.

23. (new) The method of claim 21 wherein said metal comprises titanium.

24. (new) The method of claim 21 wherein said alloy comprises stainless steel.

25. (new) The method of claim 14 including adding at least one additional layer to said device, said additional layer and said membrane layer comprising a material selected from the group consisting of a metal, a metal oxide, an alloy, and a ceramic.

26. (new) The method of claim 25 wherein said alloy comprises an alloy of a metal selected from the group consisting of gold, platinum, titanium, stainless steel, aluminum oxide, and nickel titanium alloy.

27. (new) The method of claim 25 wherein said ceramic comprises hydroxyapatite.

28. (new) The method of claim 14 including adding at least one additional layer to said device, said at least one additional layer comprising a conducting polymer or copolymer.

29. (new) The method of claim 28 wherein said conducting polymer or copolymer comprises a monomer selected from the group consisting of pyrrole, aniline, thiophene, para-phenylene, vinylene, phenylene, and substituted forms of said monomers.

30. (new) The method of claim 14 including adding at least one additional layer to said device, said at least one additional layer and said membrane layer comprising a polymer comprising a monomer selected from the group consisting of polyimide, polyamide, polyurethane, poly-(tetrafluoroethylene), poly-(dimethylsiloxan), poly-(methylmethacrylate), polyesters, poly(vinyl chloride), and polyethylene, and substituted forms of said monomers.

31. (new) The method of claim 14 wherein said opening of said window in said substrate comprises selectively removing a portion of said substrate under said membrane layer over an area greater than the predetermined final size of said device, whereby said removing of said device from said substrate frame comprises said membrane freely hanging in said substrate support frame providing access from both sides for additional processing, and including adding at least one additional layer to each side of said membrane.

32. (new) The method of claim 31 wherein said selective removal of said portion of said substrate comprises wet chemical etching.

33. (new) The method of claim 31 wherein said at least one additional layers added to each side of said membrane are added simultaneously.

34. (new) The method of claim 31 wherein said at least one additional layers added to each side of said membrane are added separately.

35. (new) The method of claim 14 wherein said removing of said device from said substrate frame comprises partially cutting said device from said substrate frame, activating said partially cut device, and completely cutting said device from said substrate frame.

36. (new) The method of claim 14 wherein said micromachined layered device comprises an actuator, and

including activating said device removed from said substrate frame.

37. (new) The method of claim 14 wherein said micromachined layered device comprises a microactuator.